CLAIMS

What is claimed is:

1. A filter element, comprising:

a ring of filtration media circumscribing a central axis and defining a central cavity, the filtration media ring having a first end and a second end;

a first, circular end cap having an inner surface sealingly bonded to the first end of the media ring, the first end cap including an annular body portion bounding a central opening into the central cavity of the media, a vent orifice in the annular body into the central cavity at a predetermined location, and an orientation device fixed to and integral with the first end cap and projecting radially outward therefrom; and

a second, circular end cap sealingly bonded to the second end of the media ring, a retaining device fixed to and integral with the second end cap and projecting outwardly therefrom.

2. The filter element as in claim 1, further including a flexible seal bounding the central opening of the first end cap.

3. The filter element as in claim 2, wherein the flexible seal is unitary with the first end cap.

4. The filter element as in claim 1, wherein the retaining device is unitary with the second end cap.

5. The filter element as in claim 1, wherein the first end cap includes a sleeve outwardly bounding the peripheral edge of the first end cap, and extending a short

distance from the first end cap toward the second end cap, the orientation device being unitary with the sleeve of the first end cap and projecting radially outward therefrom.

6. The filter element as in claim 1, wherein the orientation device is unitary with the end cap.

7. The filter element as in claim 1, wherein the retaining devices comprise a plurality of individual elements, fixed to and integral with the second end cap and projecting radially outward therefrom.

8. The filter element as in claim 1, wherein the retaining device projects axially outward from the second end cap.

9. The filter element as in claim 1, wherein the retaining device projects radially outward from the second end cap.

10. The filter element as in claim 1, wherein the second end cap includes a sleeve outwardly bounding the peripheral edge of the second end cap, and extending a short distance from the second end cap toward the first end cap, the retaining device being unitary with the sleeve of the second end cap and projecting radially outward therefrom.

11. A filter assembly comprising a housing having a threaded open end, a closed end, and a central axis, a first port to direct fluid into the housing and a second port to direct fluid from the housing, the housing including orientation means integral with an internal surface of the housing and projecting outwardly therefrom; a cup-shaped cover with threads adapted to be screwed down onto the threaded open end of the housing, the cover including retaining means internally of the cover; and a filter element removeably disposed within the housing, the filter element including a ring of filtration media circumscribing a central axis and defining a central cavity, the filtration media ring

having a first end and a second end; a first, circular end cap at the first end of the media ring, and an annular body portion bounding a central opening for receiving a cylindrical component, and an annular seal bounding the central opening of the first end cap for providing a fluid seal with the cylindrical component, a vent orifice in the first end cap into the central cavity of the filter element, and a cooperating orientation means integral with the first end cap and projecting outwardly therefrom, the orientation means of the first end cap having a configuration such that the orientation means on the first end cap cooperates with the orientation means in the housing when the element is fully received therein to rotationally orient the filter element with respect to the housing such that the orifice in the first end cap is in a predetermined rotational position relative to the housing; and

a second, circular end cap at the second end of the media ring, the second end cap including retaining means, the retaining means of the second end cap interengaging with the retaining means of the cover to temporarily couple the end cap to the cover when the cover is initially screwed down onto the housing, wherein when the cover is initially screwed down onto the housing, the filter element rotates in conjunction with the cover until the cover is screwed down a predetermined amount, after which the orientation means of the first end cap engages the orientation means of the housing, to rotationally lock the filter element with respect to the housing, the interengagement between the cover and element being such that when the orientation means of the housing and first end cap engage, the cover can thereafter rotate with respect to the filter element as the cover is fully screwed down onto the housing.

12. A filter assembly comprising a housing having a threaded open end, a closed end, and a central axis, a first port to direct fluid into the housing and a second port to direct fluid from the housing, the housing including an orientation device integral with an internal surface of the housing and projecting radially inward therefrom; a cup-shaped cover with threads adapted to be screwed down onto the threaded open end of the housing, the cover including a retaining device internally of the cover and projecting

radially outwardly therefrom; and a filter element removeably disposed within the housing, the filter element including a ring of filtration media circumscribing a central axis and defining a central cavity, the filtration media ring having a first end and a second end; a first, circular end cap at the first end of the media ring, having an annular body portion bounding a central opening for receiving a cylindrical component, and an annular seal bounding the central opening of the first end cap for providing a fluid seal with the cylindrical component, a vent orifice in the first end cap into the central cavity of the filter element, and a cooperating orientation device integral with the first end cap and projecting radially outwardly therefrom, the orientation device of the first end cap having a configuration such that the orientation device on the first end cap cooperates with the orientation device in the housing when the element is fully received therein to rotationally orient the filter element with respect to the housing such that the orifice in the first end cap is in a predetermined rotational position relative to the housing; and

a second, circular end cap at the second end of the media ring, a retaining device integral with the second end cap and projecting outwardly therefrom, the retaining device of the second end cap having a configuration such that the retaining device of the second end cap interengages with the retaining device on the cover to temporarily couple the end cap to the cover when the cover is initially screwed down onto the housing, wherein when the cover is initially screwed down onto the housing, the filter element rotates in conjunction with the cover until the cover is screwed down a predetermined amount, after which the orientation device on the first end cap engages the orientation device on the housing, to rotationally lock the filter element with respect to the housing, the interengagement between the cover and element being such that when the orientation device on the housing and first end cap engage, the cover can thereafter rotate with respect to the filter element as the cover is fully screwed down onto the housing.

13. The filter assembly as in claim 12, wherein the retaining device on the cover comprises a rib, ridge or tab, and the retaining device on the second end cap comprises a pair of closely-spaced ribs, ridges or tabs for each retaining device on the cover.

14. The filter assembly as in claim 12, wherein the orientation device on the first end cap comprises a rib, ridge or tab and the orientation device on the housing comprises a rib, ridge or tab.